



[240] Atty Dkt: CGW-263.1/Borrelli 64A

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Applicant : Nicholas F. Borrelli, Thomas P. Seward III, and
Charlene M. Smith
Appl. No. : 10/039,507
Filed : October 26, 2001
For : SILICA WITH LOW COMPACTION UNDER HIGH
ENERGY IRRADIATION
Examiner : M. Colaianni
Group : 1731

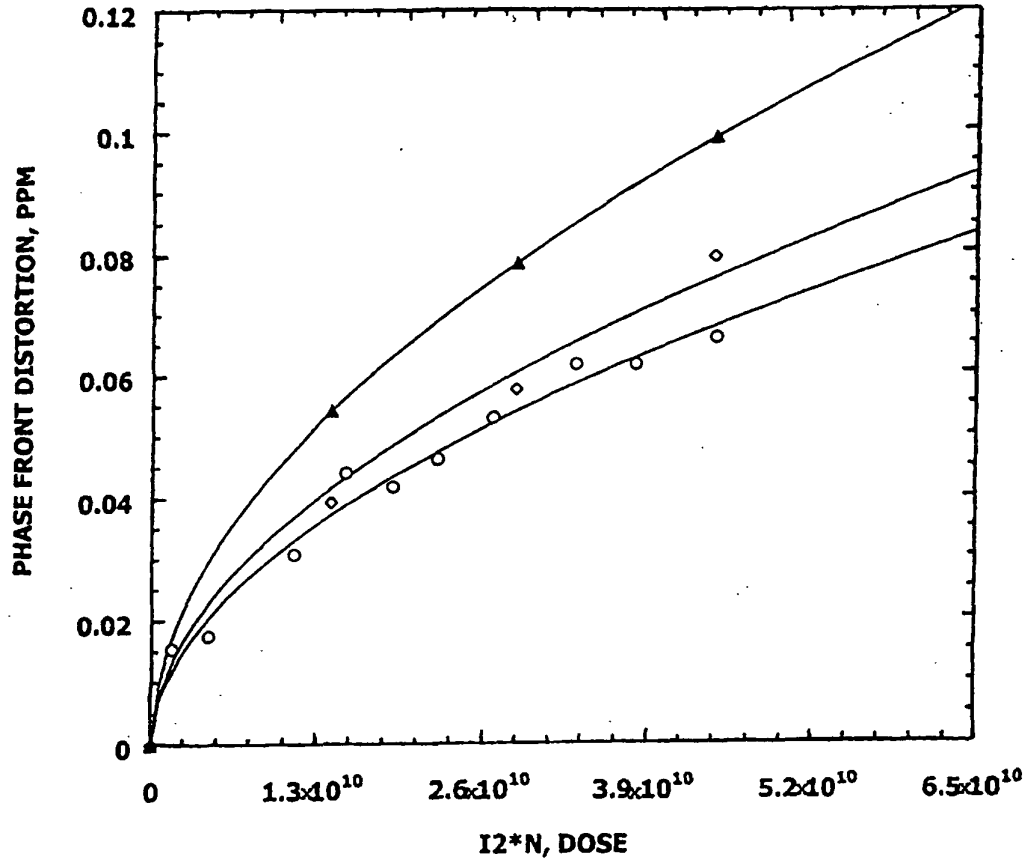
RESPONSE

This is in response to the Office Action dated March 12, 2003. In that Office Action, the Examiner rejected applicants' Claims 2-4 and 6-11 under 35 USC §103(a) over Schermerhorn et al., U.S. Patent No. 4,789,389 (Schermerhorn et al.), in view of Komine et al., U.S. Patent No. 5707908 (Komine et al.). Applicants respectfully traverse this rejection.

The present invention deals with the challenging problem of compaction of fused silica stepper lenses by high intensity excimer radiation. As discussed in applicants' specification, the mechanisms by which exposure to high energy laser irradiation causes damage to fused silica are not settled in the art with several possible theories being advanced in the literature. See, for example, pages 1-2 of applicants' specification. Under these circumstances, the discovery of a manufacturing process which reduces compaction of stepper lenses represents an important contribution to the art.

As illustrated by the following figure from the present application, applicants have discovered just such a process. In particular, applicants have surprisingly discovered that fused silica produced by the sol-gel/sintering process of independent Claims 2 and 6 achieves reduced

compaction compared to standard fused silica for use in stepper lenses produced by Corning Incorporated, the assignee of this application.



In this figure, the data shown by triangles is for Corning's Code HPFS® fused silica which had been optimized for deep ultraviolet transmittance and optical homogeneity, while the data shown by diamonds is for the method of Claims 2 and 6. A glass with lower compaction is one that has a lower phase front distortion.

As can be seen in this figure, the glass of Claims 2 and 6 has lower compaction than Corning's standard process glass at all dose levels tested. Significantly, neither of the Schermerhorn et al. or Komine et al. references

cited by the Examiner in any way discloses or suggests this important improvement in compaction achieved by the process of these claims.

As acknowledged by the Examiner, neither of the cited references anticipate applicants' claims. However, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art to combine Komine et al.'s discussion of stepper lenses with Schermerhorn et al.'s disclosure of the sol-gel/sintering process to arrive at the present invention. In particular, the Examiner points to the discussion of UV transmission properties which appears in Example 2 of Schermerhorn et al.:

...Schermerhorn et al. teach that their sol-gel produced glass material is used for making optical quality glasses (i.e. lenses) having good UV transmitting properties (col. 13-14, "Example 2", col. 14, lines 55-68). (3/12/03 Office Action at page 3.)

Applicants respectfully submit that the Schermerhorn et al. disclosure in Example 2 regarding UV properties would in fact lead a person skilled in the art away from the present invention, rather than towards it. Thus, at column 14, lines 55-65, Schermerhorn et al. state:

Finished glass products produced in accordance with the foregoing procedures have been found to have the following characteristics: ... (3) a UV transmission coefficient at 200 nm of approximately 82% for 10 mm of glass; (4) a UV transmission coefficient at 185 nm of approximately 70% for 10 mm of glass; ...

At column 15, lines 7-16, Schermerhorn et al. compare this performance with that of premium quality fused silica glass sold by Corning under the designation 7940:

For comparison, a commercially available premium quality fused silica glass sold by Corning Glass Works under the designation 7940 has the following characteristics: ... (3) a UV transmission coefficient at 200 nm of approximately 88% for 10 mm of glass; (4) a UV transmission coefficient at 185 nm of approximately 80% for 10 mm of glass; ...

Thus, the data presented in Schermerhorn et al. shows lower UV transmission levels for its Example 2 glass than for the commercially available 7940 glass. Applicants respectfully submit that a person skilled in the art seeing this data showing lowered UV transmission levels would be led away from the sol-gel/sintering process as a method for producing stepper lenses for use with UV light.

In addition to such leading away, the Schermerhorn et al. patent certainly cannot be said to have given a person skilled in the art any inkling that the sol-gel/sintering process would lead to the unexpected result of lower compaction levels illustrated by the figure set forth above.

As recently summarized by the CAFC in In re Mayne, 104 F.3d 1339, 1343, 41 USPQ2d 1451, 1455 (Fed. Cir. 1997), quoting from In re Soni, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995):

The basic principle behind this rule is straight forward -- that which would have been surprising to a person of ordinary skill in a particular art would not have been obvious. The principle applies most often to the less predictable fields, such as chemistry, where minor changes in a product or process may yield substantially different results.

Put simply, a person of ordinary skill in the art would not have expected the improvement in compaction which applicants discovered for the process of independent Claims 2 and 6. This being the case, applicants respectfully submit that these claims, and their dependent claims, are properly patentable under §103.

The foregoing considerations also apply to the Examiner's double patenting rejection. As discussed above, a person skilled in the art would not have expected the improved compaction which applicants discovered for the process of Claims 2 and 6. Accordingly, those claims and their dependent claims would not have been obvious from Claims 1, 2, and 4 of

Schermerhorn et al., whether taken alone or in combination with Komine et al.

In conclusion, based on the foregoing, applicants respectfully submit that Claims 2-4 and 6-11 are properly patentable under both 35 USC §103 and the judicially created double patenting doctrine. Accordingly, reconsideration and the issuance of a notice of allowance for this application are respectfully requested.¹

Respectfully submitted,

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¹ Submitted herewith is a petition under 37 CFR §1.136 and the required fee requesting a one month extension in which to file this response to the March 12, 2003 Office Action. With the extension, this paper is due on July 14, 2003. No further extension of time is believed to be necessary, but if such an extension of time is required, applicants request that this be considered a petition therefor. The Commissioner is hereby authorized to charge any fees which may be required for such an extension to Deposit Account No. 11-1158.